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TRANSMITTAL OF RESPONSES TO RISK ASSESSMENT COMMENTS ON THE REPORT "CHARACTERIZATION OF BACKGROUND WATER QUALITY FOR STREAMS AND GROUNDWATER"

10/26/93

DOE-0173-94
DOE-FN/EPA
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RESPONSES

Department of Energy
Fernald Environmental Management Project
P.O. Box 398705
Cincinnati, Ohio 45239-8705
(513) 738-6357

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OCT 2 6 1993

DOE-0173-94

Mr. James A. Saric, Remedial Project Director
U.S. Environmental Protection Agency
Region V - 5HRE-8J
77 W. Jackson Boulevard
Chicago, Illinois 60604-3590

Mr. Graham E. Mitchell, Project Manager
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Mitchell:

TRANSMITTAL OF RESPONSE TO RISK ASSESSMENT COMMENTS ON THE REPORT "CHARACTERIZATION OF BACKGROUND WATER QUALITY FOR STREAMS AND GROUNDWATER"

References: 1) Letter, J.A. Saric to J.R. Craig, "Conditional Approval of Characterization of Background for Streams and Groundwater," dated June 10, 1993

2) Letter, J.R. Craig to J.A. Saric, "Transmittal of Response to Comments on the Report Characterization of Background Water Quality for Streams and Groundwater," dated August 31, 1993

Enclosed are responses to the United States Environmental Protection Agency (U.S. EPA) risk assessment comments on the report, Characterization of Background Water Quality for Streams and Groundwater (Reference 1). As explained in Reference 2, the Department of Energy, Fernald Field Office (DOE-FN) is responding to the U.S. EPA's two comments on risk assessment separately because the comments raise issues which go beyond the scope of the Background report.

The Background report will be revised at a later date once data from additional sampling of locations W1 (background location on the Great Miami River) and W5 (background location on Paddys Run) become available and the responses to U.S. EPA and Ohio Environmental Protection Agency (OEPA) comments are finalized.

If you or your staff have any questions, please contact Kathi Nickel at (513) 648-3107.

Sincerely,

for Johnny Reising

Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Nickel

Enclosure: As Stated

cc w/enc:

K. A. Chaney, EM-424, TREV
D. R. Kozlowski, EM-424 TREV
G. Jablonowski, USEPA-V, AT-18J
J. Kwasniewski, OEPA-Columbus
P. Harris, OEPA-Dayton
M. Proffitt, OEPA-Dayton
T. Schneider, OEPA-Dayton
J. Michaels, PRC
L. August, GeoTrans
F. Bell, ATSDR
K. L. Alkema, FERMCO
B. S. Biehle, FERMCO/52-5
P. F. Clay, FERMCO/19
AR Coordinator, FERMCO

cc w/o enc:

K. L. Alkema, FERMCO/65-2
A. K. Bomberger, FERMCO/52-5
P. F. Clay, FERMCO/52-2
J. W. Thiesing, FERMCO/2
R. L. Glenn, Parsons

RESPONSE TO U.S. EPA RISK ASSESSMENT COMMENTS
CHARACTERIZATION OF BACKGROUND WATER QUALITY FOR STREAMS AND GROUNDWATER REPORT
MAY 1993

RISK ASSESSMENT ISSUES

1 **Comment:** At FEMP, there is a risk assessment issue regarding filtered and unfiltered metals analyses for groundwater. All metals analyses were conducted on filtered samples, including groundwater samples from private wells. Private wells are being used to calculate background levels in the glacial overburden and the Great Miami Aquifer. Using filtered versus unfiltered samples is probably of less concern in monitoring wells installed in the Great Miami Aquifer, because the wells were developed using a relatively low turbidity requirement. However, the issue is of greater concern for monitoring wells in the glacial overburden, where the turbidity requirement could not be reached, and for private wells in the glacial till and Great Miami Aquifer, which were installed without regard to turbidity.

A 0.45 micron (μm) membrane filter size was used to filter groundwater samples. According to the U.S. Environmental Protection Agency's *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A)*, dated December 1989, a 0.45-μm filter may screen out some potentially mobile particulates to which contaminants are absorbed, thus underrepresenting contaminant concentrations (see Page 4-13 of the guidance). The guidance suggests the use of a 1.0 μm-filter. In addition, the guidance states that if unfiltered water is of potable quality, data from unfiltered water samples should be used to estimate exposure (see Page 4-13 and 6-27 of the guidance).

Two options exist to overcome this potential problem: (1) collect one round of groundwater samples from all background wells and other selected wells, analyze unfiltered samples for metals, and compare data for filtered and unfiltered samples to determine which data to use in the risk assessment; or (2) explain the impact of using filtered metals data on the results of the risk assessment. Option 1 is more favorable but may be impractical at this point in the process.

Response: The DOE agrees that the use of filtered versus unfiltered data is an issue that must be addressed in RI/FS investigations and public health risk assessments. Unfiltered and filtered metals samples were collected from the majority of the FEMP background monitoring wells during the OU5 groundwater monitoring Snapshot Program.

Action: The *Background* report will be revised at a later date when unfiltered and filtered metals data from the Snapshot Program have been received and validated. When validated, the OU5 Snapshot data will be available for future risk assessments prepared for the FEMP. Also, as suggested by the reviewer in Option 2, the DOE will comment in each RI Report (except for the OU4 RI, which has already been submitted to EPA) on the impact of using filtered background metals data on the results of risk assessments.

2 **Comment:** Section 9 presents the conclusions of the background calculations and summarizes Section 4.0. One problem with the scheme outlined in Section 4.0 results from several parameters having upper tolerance limits that exceed health-based standards, particularly regarding applicable regulations like maximum contaminant levels (MCL) and corresponding action levels for copper and lead. Affected parameters include the following:

- Cadmium and mercury in all three water sources listed in Table 21
- Arsenic, chromium, lead, and nickel in both aquifers
- Beryllium in the glacial overburden
- Antimony and nitrate in the Great Miami Aquifer.

When using data to decide which contaminants should be considered chemicals of concern for the risk assessment, FEMP should lower the tolerance limits for these analytes to the MCL. In any event, all risk assessments should include separate, parallel calculations for the risk posed by relevant background concentrations. The calculations should be drawn from the data base used in this background study and should use the same exposure point concentrations, water sources (aquifers and streams), and so on as the risk assessment itself. In addition, the calculations should include all background chemicals, whether they are used in the main risk assessment or not. This type of information will be useful to risk managers when making decisions.

Response: In nearly every case, the arithmetic mean, geometric mean, or median values of background concentrations for metals were below respective maximum concentration limits (MCLs/MCLGs). The only exception that was evident was the median value for cadmium for the Great Miami River (6 μg/L), which exceeds the MCL of 5 μg/L. Because of the high variability of concentrations in background levels, the standard deviation of sample populations is high, and the UCLs and UTLs are subsequently high. The UCLs and UTLs were calculated using data collected during RI/FS studies and procedures recommended by the U.S. EPA.

The DOE does not agree that "the FEMP should lower the tolerance limits for analytes to the MCLs." A comparison to MCLs is an important consideration in the selection of constituents of concern (CPCs). As discussed in the attached Guidance, *Selected Exposure Routes and Contaminants of Concern by Risk-Based Screening*, a comparison to background and a comparison to MCLs are among the many factors that should be considered in the selection of CPCs. Neither factor should be applied independently of the other. Rather all factors listed in the Guidance should be considered in an effort to properly select CPCs.

The DOE agrees that baseline risk assessments should include an assessment of background concentrations.

Action: A risk assessment of background concentrations will be included in all risk assessments.

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United States Environmental Protection Agency
Region III Philadelphia, PA 19107
EPA/903/R-93-001
January 1993

Region III
Technical Guidance Manual
Risk Assessment

Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening

EPA Contact: Dr. Roy L. Smith

EPA
Region III

Hazardous Waste Management Division
Office of Superfund Programs
January 1993

Human health risk assessment includes effort-intensive steps which require many detailed calculations by experts. Most baseline risk assessments are dominated by a few chemicals and a few routes of exposure. Effort expended on minor contaminants and exposure routes, i.e., those which do not influence overall risk, is essentially wasted. This guidance is intended to identify and focus on dominant contaminants of concern and exposure routes at the earliest feasible point in the baseline risk assessment. Use of these methods will decrease effort and time spent assessing risk, without loss of protectiveness. This guidance is not intended for other risk assessment activities, such as determining preliminary remediation goals.

SELECTING CONTAMINANTS AND EXPOSURE ROUTES OF CONCERN

Most samples from hazardous waste sites are analyzed for 103 target compounds and analytes recommended by the EPA Superfund program. Semi-volatile analysis can detect additional tentatively identified compounds not on the target lists. Special analytical services procedures, if used, may find still more contaminants. The combined number of contaminants detected at a site sometimes exceeds one hundred.

While EPA considers it necessary to gather information on many contaminants, very little of this data actually influences the overall quantitative assessment of health risk. For most sites, baseline risk assessments are dominated by a few contaminants and a few routes of exposure. The remaining tens, or hundreds, of detected contaminants have a minimal influence on total risk. This small impact is lost by rounding. Entire environmental media may contain not a single contaminant at a concentration which could adversely affect public health. Quantitative risk calculations using data from such "risk-free" media have no effect on the overall risk estimate for the site.

The EPA baseline risk assessment process at several points requires careful data evaluation by scientific experts. These evaluations, which are contaminant-specific, include: (1) statistical comparisons between site-related and background samples, (2) special handling of undetected contaminants, (3) calculation of toxicity equivalence, (4) evaluation of frequency of detection, and (5) comparison with ARARs. Because overall risk is usually driven by a few contaminants and exposure routes, effort spent in detailed evaluation of minor contaminants and routes of exposure is essentially wasted. For some sites, this wasted effort exceeds 90% of the total.

The baseline risk assessment process can be made more efficient by focusing on dominant contaminants and routes of exposure at the earliest feasible stage. The mechanisms recommended for this are (1) a re-ordering of the process of eliminating contaminants and routes of exposure, and (2) use of a risk-based concentration screen. Appropriately used, this process can dramatically reduce the effort of risk assessment, while not changing the result significantly.

EXISTING GUIDANCE

Chapter 5 of "RAGS IA" (Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A); EPA, 1989) provides a detailed procedure for evaluating data for a baseline risk assessment. This procedure includes steps by which the risk assessor selects contaminants of concern in each exposure medium. These steps are summarized in Table 1.

There are two major limitations to the RAGS procedure. First, the eliminating step (a concentration toxicity screen) comes late in the process. Many of the preceding steps (e.g., evaluation of quantitation limits, comparison with background, calculation of toxicity equivalence, and evaluation of frequency of detection) are contaminant- and medium-specific. They require the sustained attention of an expert, and cannot be automated. If the contaminant is eliminated, this work is wasted.

The second limitation is that the concentration toxicity screen compares only relative risk among contaminants in the same medium. While very efficient at selecting dominant contaminants in each medium, this method does not evaluate significance of total risk for the medium. Thus, the concentration toxicity screen can eliminate contaminants, but not routes of exposure.

RECOMMENDED METHODOLOGY

's guidance makes two changes intended to remove ..e limitations in existing guidance. These recommendations are intended for baseline risk assessments.

1. *Re-ordering of steps.* The eliminating screen is moved forward in the data evaluation process to a point immediately following data quality evaluation. The new process is shown in Table 2. Effort-intensive steps such as evaluation of quantitation limits and comparison with background now follow the eliminating screen. The ··-s are divided into four categories: data quality ·..uation, initial data set reduction, re-inclusion of special cases, and optional final data set reduction.

The data quality evaluation steps (evaluating appropriateness of methods and qualifiers, significance of blank contamination, and need for special analyses) should be done as described in RAGS IA, Chapter 5. Next, the risk assessor should consult with the RPM to discuss the use of the risk-based concentration table (described in item [2] below) as a screening mechanism. With the RPM's approval, the risk assessor should reduce the data set and document the rationale for eliminating contaminants and routes of exposure from further analysis.

After the initial data set reduction, the risk assessor and RPM should consider re-including specific contaminants on the basis of historical data, toxicity, mobility, persistence, bioaccumulation, special exposure routes, special treatability problems, or exceedance of ARARs. These activities should proceed as described in Section 5.9 of RAGS IA.

Finally, optional further reductions in the data set may be justified, based on the status of a contaminant as an essential nutrient, low frequency of detection, or no statistical difference between site and background levels. These evaluations, the most complicated and contaminant-specific, are saved for last.

2. *Screening by risk-based concentrations.* The screening method is changed from the relative concentration toxicity screen of RAGS IA to an absolute comparison of risk. This is done by means of a table of risk-based concentrations (Appendix I). This table contains levels of nearly 600 contaminants in air, drinking water, fish tissue, and soil, which correspond to a systemic hazard quotient of 0.1 or a lifetime cancer risk of 10^{-6}. The risk-based concentrations were developed using protective default exposure scenarios suggested by EPA (1991) and the best available reference doses and carcinogenic potency slopes (see the table for sources), and represent relatively protective environmental concentrations at which EPA would typically not take action.

The risk-based concentration screen is used as follows:

(a) The risk assessor extracts the maximum concentration of each substance detected in each medium.

(b) If the maximum concentration exceeds the risk-based concentration for that medium, the contaminant is retained for risk assessment, for all routes of exposure involving that medium. Otherwise the contaminant is dropped for that medium.

(c) If a specific contaminant does not exceed its risk-based concentration for any medium, the contaminant is dropped from the risk assessment.

(d) If no contaminant in a specific medium exceeds its risk-based concentration, the medium is dropped from the risk assessment.

(e) All contaminants and exposure routes which are dropped are kept on a sub-list and considered for re-inclusion, based on special properties.

(f) If the risk assessor wants to include a route of exposure not covered in the risk-based concentration table, the equations provided in Appendix I can serve as the basis for new risk-

based concentrations. Similarly, the risk assessor can use the same equations to calculate alternate risk levels (i.e., other than a systemic hazard quotient of 0.1 and lifetime cancer risk of 10^{-6}) to be the basis for screening.

SUMMARY

The process by which contaminants and exposure routes are selected in quantitative risk assessment can be made less effort-intensive by two simple changes. First, high-effort steps should be postponed until later in the selection process, because performing these operations on trivial contaminants and exposure routes is pointless. Second, changing from a relative concentration toxicity screen to an absolute risk-based concentration screen improves the risk assessor's ability to focus on dominant contaminants and exposure routes at an earlier stage.

REFERENCES

EPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors". OSWER Directive 9285.6-03, Office of Emergency and Remedial Response, March 25, 1991.

EPA, 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A). Office of Emergency and Remedial Response, December, 1989. EPA/540/1-89/002.

For additional information, call (215) 597-8682.

Approved by: ______________________
Thomas C. Voltaggio, Director
Hazardous Waste Management Division

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Table 1. Summary of existing EPA guidance on selecting contaminants of concern (EPA, 1989, chapter 5)
Section 5.1: Combining data from site investigations
1. Determine if methods are appropriate
2. Evaluate quantitation limits
3. Determine if qualifiers are appropriate
4. Determine if significant blank contamination exists
5. Determine if special analyses for tentatively identified compounds are needed
6. Compare site samples to background
Section 5.9: Further reduction in the number of chemicals (optional)
7. Consult with RPM
8. Document rationale for eliminating chemicals
9. Examine historical information
10. Consider exceptional toxicity, mobility, persistence, or bioaccumulation
11. Consider special exposure routes
12. Consider special treatability problems
13. Determine if contaminants exceed ARARs
14. Group chemicals by class, evaluate toxicity equivalence
15. Evaluate frequency of detection
16. Evaluate essentiality
17. Use a concentration toxicity screen

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Table 2. EPA Region III guidance on selecting contaminants and exposure routes of concern
A. *Data quality evaluation*
1. Determine if methods are appropriate
2. Determine if qualifiers are appropriate
3. Determine if significant blank contamination exists
4. Determine if special analyses for tentatively identified compounds are needed
B. Reduce data set using risk-based concentration screen
5. Consult with RPM
6. Use risk-based concentration table to screen contaminants and exposure routes of concern
7. Document rationale for eliminating chemicals and exposure routes
C. Consider re-including eliminated chemicals and routes, based on:
8. Historical information
9. Exceptional toxicity, mobility, persistence, or bioaccumulation
10. Special exposure routes
11. Special treatability problems
12. ARARs exceedance
13. Toxicity equivalence of chemical class (*e.g.*, CDD/CDFs, PAHs)
D. Make further specific reductions in data set (optional)
14. Evaluate essentiality
15. Evaluate frequency of detection
16. Compare site samples to background

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Appendix I:
EPA Region III Risk-Based Concentration Table
Background Information

The risk-based concentrations were calculated as follows:

GENERAL: Separate risk-based concentrations were calculated for carcinogenic and non-carcinogenic effects of each compound for each pathway. The concentration in the table is the lower of the two, rounded to two significant figures. For non-carcinogenic effects, the averaging time equals the exposure duration, so the exposure duration term has been used for both. The following terms were used in the calculations:

General:	
Oral carcinogenic slope factor $(mg/kg/d)^{-1}$:	SF_o
Inhaled carcinogenic slope factor $(mg/kg/d)^{-1}$:	SF_i
Oral reference dose (mg/kg/d):	RfD_o
Inhaled reference dose (mg/kg/d):	RfD_i
Target cancer risk:	TR
Target hazard quotient:	THQ
Body weight, adult (kg):	BW_a
Body weight, child age 1-6 (kg):	BW_c
Averaging time (years of life):	AT
Air breathed (m^3/d):	IR_a
Drinking water ingestion (L/d):	IR_w
Fish ingestion (g/d):	IR_f
Soil ingestion - age adjusted (mg/d)	IRS_{adj}
Soil ingestion - age 1-6 (mg/d):	IRS_c
Soil ingestion - adult (mg/d):	IRS_a
Residential:	
Exposure frequency (d/y):	EF_r
Exposure duration (y):	ED_r
Volatilization factor (L/m^3):	VF
Commercial/industrial:	
Exposure frequency (d/y):	EF_o
Exposure duration (y):	ED_o

The priority among sources of toxicological constants was as follows: (1) IRIS, (2) HEAST, (3) HEAST alternative method, (4) ECAO-Cincinnati, (5) other EPA documents, (6) withdrawn from IRIS, and (7) withdrawn from HEAST. Each source was used only if numbers from higher-priority sources were unavailable.

ALGORITHMS:

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1. Residential water use (µg/L). Volatilization terms were calculated only for compounds with "y" in the "Volatile" column. Compounds having a Henry's Law constant greater than 10^{-5} were considered volatile. The list may be incomplete, but is unlikely to include false positives. The equations and the volatilization factor (VF, above) were obtained from the draft RAGS IB. Oral potency slopes and reference doses were used for both oral and inhaled exposures for volatile compounds lacking inhalation values. Inhaled potency slopes were substituted for unavailable oral potency slopes only for volatile compounds; inhaled RfDs were substituted for unavailable oral RfDs for both volatile and non-volatile compounds.

a. Carcinogenic effects:

$$\frac{TR \cdot BW_a \cdot AT \cdot 365\tfrac{d}{y} \cdot 1000\tfrac{\mu g}{mg}}{EF_r \cdot ED_r \cdot ([VF \cdot IR_a \cdot CPS_i] + [IR_w \cdot SF_o])}$$

b. Non-carcinogenic effects:

$$\frac{THQ \cdot BW_a \cdot ED_r \cdot 365\tfrac{d}{y} \cdot 1000\tfrac{\mu g}{mg}}{EF_r \cdot ED_r \cdot \left(\frac{VF \cdot IR_a}{RfD_i} + \frac{IR_w}{RfD_o}\right)}$$

2. Air (µg/m³). Oral potency slopes and references were used where inhalation values were not available.

a. Carcinogenic effects:

$$\frac{TR \cdot BW_a \cdot AT \cdot 365\tfrac{d}{y} \cdot 1000\tfrac{\mu g}{mg}}{EF_r \cdot ED_r \cdot IR_a \cdot SF_i}$$

b. Non-carcinogenic effects:

$$\frac{THQ \cdot RfD_i \cdot BW_a \cdot ED_r \cdot 365\tfrac{d}{y} \cdot 1000\tfrac{\mu g}{mg}}{EF_r \cdot ED_r \cdot IR_a}$$

3. Fish (mg/kg):

a. Carcinogenic effects:

$$\frac{TR \cdot BW_a \cdot AT \cdot 365\tfrac{d}{y}}{EF_r \cdot ED_r \cdot \frac{IR_f}{1000\frac{g}{kg}} \cdot SF_o}$$

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b. Non-carcinogenic effects:

$$\frac{THQ \cdot RfD_o \cdot BW_a \cdot ED_r \cdot 365\frac{d}{y}}{EF_r \cdot ED_r \cdot \frac{IR_f}{1000\frac{g}{kg}}}$$

4. Soil commercial/industrial (mg/kg): The default exposure assumption that only 50% of incidential soil ingestion occurs at work has been omitted.

a. Carcinogenic effects:

$$\frac{TR \cdot BW_a \cdot AT \cdot 365\frac{d}{y}}{EF_o \cdot ED_o \cdot \frac{IRS_a}{10^6\frac{mg}{kg}} \cdot SF_o}$$

b. Non-carcinogenic effects:

$$\frac{THQ \cdot RfD_o \cdot BW_a \cdot ED_o \cdot 365\frac{d}{y}}{EF_o \cdot ED_o \cdot \frac{IRS_a}{10^6\frac{mg}{kg}}}$$

5. Soil residential (mg/kg):

a. Carcinogenic effects:

$$\frac{TR \cdot BW_a \cdot AT \cdot 365\frac{d}{y}}{EF_r \cdot ED_r \cdot \frac{IRS_a}{10^6\frac{mg}{kg}} \cdot CPS_o}$$

b. Non-carcinogenic effects:

$$\frac{THQ \cdot RfD_o \cdot BW_c \cdot ED_r \cdot 365\frac{d}{y}}{EF_r \cdot ED_r \cdot \frac{IRS_c}{10^6\frac{mg}{kg}}}$$

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EXPOSURE ASSUMPTIONS:	
1-General:	
Target cancer risk:	1e-06
Target hazard quotient:	0.1
Body weight, adult (kg):	70
Body weight, age 1-6 (kg):	15
Averaging time (years of life):	70
Air breathed (m3/d):	20
Drinking water ingestion (L/d):	2
Fish ingestion (g/d):	54
Soil ingestion - age adjusted (mg/d):	100
Soil ingestion - age 1-6 (mg/d):	200
Soil ingestion - adult (mg/d):	100
2-Residential:	
Exposure frequency (d/y):	350
Exposure duration (y):	30
Volatilization factor (L/m3):	0.5
3-Occupational:	
Exposure frequency (d/y):	250
Exposure duration (y):	25

EPA Region III Risk-Based Concentrations (for use with Region III technical guidance on selecting exposure routes and contaminants of concern by risk-based screening): October 26, 1992

Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
Acephate	4.00e-03 i		8.70e-03 i			9.8	0.98	0.36	330	31
Acetaldehyde		2.57e-03 i		7.70e-03 i		9.4	0.94			
Acetone	1.00e-01 i					370	37	14	10000	780
Acetone cyanohydrin	7.00e-02 h	2.86e-03 a				260	1	9.5	7200	550
Acetonitrile	6.00e-03 i	1.43e-02 a				22	5.2	0.81	610	47
Acetophenone	1.00e-01 i	5.71e-06 a			y	0.0042	0.0021	14	10000	780
Acifluorfen	1.30e-02 i					47	4.7	1.8	1300	100
Acrolein	2.00e-02 h	5.71e-06 i				73	0.0021	2.7	2000	160
Acrylamide	2.00e-04 i		4.50e+00 i	4.55e+00 i		0.019	0.0019	0.0007	0.64	0.38
Acrylic acid	8.00e-02 i	8.57e-05 i				290	0.031	11	8200	630
Acrylonitrile		5.71e-04 i	5.40e-01 i	2.38e-01 i		0.16	0.036	0.0058	5.3	3.2
Alachlor	1.00e-02 i		8.05e-02 h			1.1	0.11	0.039	36	21
Alar	1.50e-01 i					550	55	20	15000	1200
Aldicarb	2.00e-04 i					0.73	0.073	0.027	20	1.6
Aldicarb sulfone	3.00e-04 x					1.1	0.11	0.041	31	2.3
Aldrin	3.00e-05 i		1.70e+01 i	1.72e+01 i		0.005	0.0005	0.00019	0.17	0.1
Ally	2.50e-01 i					910	91	34	26000	2000
Allyl alcohol	5.00e-03 i					18	1.8	0.68	510	39
Allyl chloride	5.00e-02 h	2.86e-04 i				180	0.1	6.8	5100	390
Aluminum	2.90e+00 o					11000	1100	390	300000	23000
Aluminum phosphide	4.00e-04 i					1.5	0.15	0.054	41	3.1
Amdro	3.00e-04 i					1.1	0.11	0.041	31	2.3
Ametryn	9.00e-03 i					33	3.3	1.2	920	70
m-Aminophenol	7.00e-02 h					260	26	9.5	7200	550
4-Aminopyridine	2.00e-05 h					0.073	0.0073	0.0027	2	0.16
Amitraz	2.50e-03 i					9.1	0.91	0.34	260	20
Ammonia		2.86e-02 i				100	10			
Ammonium sulfamate	2.00e-01 i					730	73	27	20000	1600
Aniline		2.86e-04 i	5.70e-03 i			1	0.1	0.55	500	300
Antimony and compounds	4.00e-04 i					1.5	0.15	0.054	41	3.1
Antimony pentoxide	5.00e-04 h					1.8	0.18	0.068	51	3.9
Antimony potassium tartrate	9.00e-04 h					3.3	0.33	0.12	92	7
Antimony tetroxide	4.00e-04 h					1.5	0.15	0.054	41	3.1
Antimony trioxide	4.00e-04 h					1.5	0.15	0.054	41	3.1
Apollo	1.30e-02 i					47	4.7	1.8	1300	100
Aramite	5.00e-02 h		2.50e-02 i	2.49e-02 i		3.4	0.34	0.13	110	68
Arsenic	3.00e-04 i					1.1	0.11	0.041	31	2.3
Arsenic (as carcinogen)			1.75e+00 i	1.51e+01 i		0.049	0.00057	0.0018	1.6	0.97

Key to Data Sources: i=IRIS x=Withdrawn from IRIS h=HEAST a=HEAST alternate method y=Withdrawn from HEAST e=EPA-ECAO o=Other EPA documents

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
Assure	9.00e-03 i					33	3.3	1.2	920	70
Asulam	5.00e-02 i					180	18	6.8	5100	390
Atrazine	5.00e-03 i		2.22e-01 h			0.38	0.038	0.014	13	7.7
Avermectin B1	4.00e-04 i					1.5	0.15	0.054	41	3.1
Azobenzene			1.10e-01 i	1.09e-01 i		0.77	0.078	0.029	26	15
Barium and compounds	7.00e-02 i	1.43e-04 a				260	0.052	9.5	7200	550
Baygon	4.00e-03 i					15	1.5	0.54	410	31
Bayleton	3.00e-02 i					110	11	4.1	3100	230
Baythroid	2.50e-02 i					91	9.1	3.4	2600	200
Benefin	3.00e-01 i					1100	110	41	31000	2300
Benomyl	5.00e-02 i					180	18	6.8	5100	390
Bentazon	2.50e-03 i					9.1	0.91	0.34	260	20
Benzaldehyde	1.00e-01 i				y	61	37	14	10000	780
Benzene			2.90e-02 i	2.91e-02 i	y	0.49	0.29	0.11	99	59
Benzidine	3.00e-03 i		2.30e+02 i	2.35e+02 i		0.00037	0.000036	0.000014	0.012	0.0074
Benzoic acid	4.00e+00 i					15000	1500	540	410000	31000
Benzotrichloride			1.30e+01 i			0.0066	0.00066	0.00024	0.22	0.13
Benzyl alcohol	3.00e-01 h					1100	110	41	31000	2300
Benzyl chloride			1.70e-01 i		y	0.083	0.05	0.019	17	10
Beryllium and compounds	5.00e-03 i		4.30e+00 i	8.40e+00 i		0.02	0.001	0.00073	0.67	0.4
Bidrin	1.00e-04 i					0.37	0.037	0.014	10	0.78
Biphenthrin (Talstar)	1.50e-02 i					55	5.5	2	1500	120
1,1-Biphenyl	5.00e-02 i					180	18	6.8	5100	390
Bis(2-chloroethyl)ether			1.10e+00 i	1.16e+00 i	y	0.012	0.0074	0.0029	2.6	1.5
Bis(2-chloroisopropyl)ether	4.00e-02 i		7.00e-02 h	3.50e-02 h	y	0.35	0.24	0.045	41	24
Bis(chloromethyl)ether			2.20e+02 i	2.17e+02 i	y	0.000065	0.000039	0.000014	0.013	0.0077
Bis(2-chloro-1-methylethyl)ether			7.00e-02 y	7.00e-02 y		1.2	0.12	0.045	41	24
Bis(2-ethylhexyl)phthalate (DEHP)	2.00e-02 i		1.40e-02 i			6.1	0.61	0.23	200	120
Bisphenol A	5.00e-02 i					180	18	6.8	5100	390
Boron	9.00e-02 i	5.71e-03 h				330	21	12	9200	700
Boron trifluoride		2.00e-04 h				0.73	0.073			
Bromodichloromethane	2.00e-02 i		1.30e-01 i		y	0.11	0.066	0.024	22	13
Bromoethene				1.10e-01 h	y	0.13	0.077			
Bromoform (tribromomethane)	2.00e-02 i		7.90e-03 i	3.85e-03 i	y	3.1	2.2	0.4	360	160
Bromomethane	1.40e-03 i	1.43e-03 i			y	0.87	0.52	0.19	140	11
4-Bromophenyl phenyl ether	5.80e-02 o					210	21	7.8	5900	450
Bromophos	5.00e-03 h					18	1.8	0.68	510	39
Bromoxynil	2.00e-02 i					73	7.3	2.7	2000	160

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
Bromoxynil octanoate	2.00e-02 i					73	7.3	2.7	2000	160
1,3-Butadiene				9.80e-01 i	y	0.014	0.0087			
1-Butanol	1.00e-01 i					370	37	14	10000	780
Butylate	5.00e-02 i					180	18	6.8	5100	390
Butyl benzyl phthalate	2.00e-01 i					730	73	27	20000	1600
Butylphthalyl butylglycolate	1.00e+00 i					3700	370	140	100000	7800
Cacodylic acid	3.00e-03 h					11	1.1	0.41	310	23
Cadmium and compounds	5.00e-04 i			6.30e+00 i		18	0.0014	0.068	51	3.9
Caprolactam	5.00e-01 i					1800	180	68	51000	3900
Captafol	2.00e-03 i		8.60e-03 h			7.3	0.73	0.27	200	16
Captan	1.30e-01 i		3.50e-03 h			24	2.4	0.9	820	490
Carbaryl	1.00e-01 i					370	37	14	10000	780
Carbazole			2.00e-02 h			4.3	0.43	0.16	140	85
Carbofuran	5.00e-03 i					18	1.8	0.68	510	39
Carbon disulfide	1.00e-01 i	2.86e-03 h			y	21	1	14	10000	780
Carbon tetrachloride	7.00e-04 i		1.30e-01 i	5.25e-02 i	y	0.22	0.16	0.024	22	5.5
Carbosulfan	1.00e-02 i					37	3.7	1.4	1000	78
Carboxin	1.00e-01 i					370	37	14	10000	780
Chloral	2.00e-03 i					7.3	0.73	0.27	200	16
Chloramben	1.50e-02 i					55	5.5	2	1500	120
Chloranil			4.03e-01 h			0.21	0.021	0.0078	7.1	4.2
Chlordane	6.00e-05 i		1.30e+00 i	1.30e+00 i		0.066	0.0066	0.0024	2.2	0.47
Chlorimuron-ethyl	2.00e-02 i					73	7.3	2.7	2000	160
Chlorine dioxide		5.71e-05 i				0.21	0.021			
Chloroacetaldehyde	6.90e-03 o					25	2.5	0.93	710	54
Chloroacetic acid	2.00e-03 h					7.3	0.73	0.27	200	16
2-Chloroacetophenone		8.57e-06 i				0.031	0.0031			
4-Chloroaniline	4.00e-03 i					15	1.5	0.54	410	31
Chlorobenzene	2.00e-02 i	5.71e-03 a			y	3.9	2.1	2.7	2000	160
Chlorobenzilate	2.00e-02 i					73	7.3	2.7	2000	160
p-Chlorobenzoic acid	2.00e-01 h					730	73	27	20000	1600
4-Chlorobenzotrifluoride	2.00e-02 h					73	7.3	2.7	2000	160
2-Chloro-1,3-butadiene	7.00e-03 h	2.86e-02 a			y	11	10	0.95	720	55
1-Chlorobutane	4.00e-01 h				y	240	150	54	41000	3100
2-Chloroethyl vinyl ether	2.50e-02 o				y	15	9.1	3.4	2600	200
Chloroform	1.00e-02 i		6.10e-03 i	8.05e-02 i	y	0.23	0.11	0.52	470	78
Chloromethane			1.30e-02 h	6.30e-03 h	y	1.9	1.4	0.24	220	30
4-Chloro-2-methylaniline			5.80e-01 h			0.15	0.015	0.0054	4.9	2.9

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
4-Chloro-2,2-methylaniline hydrochloride			4.60e-01 h			0.19	0.019	0.0069	6.2	3.7
beta-Chloronaphthalene	8.00e-02 i					290	29	11	8200	630
o-Chloronitrobenzene			2.50e-02 h		y	0.57	0.34	0.13	110	68
p-Chloronitrobenzene			1.80e-02 h		y	0.79	0.47	0.18	160	95
2-Chlorophenol	5.00e-03 i					18	1.8	0.68	510	39
2-Chloropropane		2.86e-02 h			y	17	10			
Chlorothalonil	1.50e-02 i		1.10e-02 h			7.7	0.77	0.29	260	120
o-Chlorotoluene	2.00e-02 i				y	12	7.3	2.7	2000	160
Chlorpropham	2.00e-01 i					730	73	27	20000	1600
Chlorpyrifos	3.00e-03 i					11	1.1	0.41	310	23
Chlorpyrifos-methyl	1.00e-02 h					37	3.7	1.4	1000	78
Chlorsulfuron	5.00e-02 i					180	18	6.8	5100	390
Chlorthiophos	8.00e-04 h					2.9	0.29	0.11	82	6.3
Chromium III and compounds	1.00e+00 i	5.71e-07 y				3700	0.00021	140	100000	7800
Chromium VI and compounds	5.00e-03 i			4.20e+01 i		18	0.0002	0.68	510	39
Coal tars				2.20e+00 h			0.0039			
Cobalt		2.86e-04 e				1	0.1			
Coke Oven Emissions				2.17e+00 i			0.0039			
Copper and compounds	3.71e-02 h					140	14	5	3800	290
Crotonaldehyde	1.00e-02 x		1.90e+00 h	1.90e+00 y		0.045	0.0045	0.0017	1.5	0.9
Cumene	4.00e-02 i	2.57e-03 h				150	0.94	5.4	4100	310
Cyanazine	2.00e-03 x					7.3	0.73	0.27	200	16
Cyanides										
Barium cyanide	1.00e-01 h					370	37	14	10000	780
Copper cyanide	5.00e-03 i					18	1.8	0.68	510	39
Calcium cyanide	4.00e-02 i					150	15	5.4	4100	310
Cyanogen	4.00e-02 i					150	15	5.4	4100	310
Cyanogen bromide	9.00e-02 i					330	33	12	9200	700
Cyanogen chloride	5.00e-02 i					180	18	6.8	5100	390
Free cyanide	2.00e-02 i					73	7.3	2.7	2000	160
Hydrogen cyanide	2.00e-02 i					73	7.3	2.7	2000	160
Potassium cyanide	5.00e-02 i					180	18	6.8	5100	390
Potassium silver cyanide	2.00e-01 i					730	73	27	20000	1600
Silver cyanide	1.00e-01 i					370	37	14	10000	780
Sodium cyanide	4.00e-02 i					150	15	5.4	4100	310
Zinc cyanide	5.00e-02 i					180	18	6.8	5100	390
Cyclohexanone	5.00e+00 i				y	3000	1800	680	510000	39000

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EPA Region III Risk-Based Concentrations (for use with Region III technical guidance on selecting exposure routes and contaminants of concern by risk-based screening): October 26, 1992

Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
Cyclohexylamine	2.00e-01 i					730	73	27	20000	1600
Cyhalothrin/Karate	5.00e-03 i					18	1.8	0.68	510	39
Cypermethrin	1.00e-02 i					37	3.7	1.4	1000	78
Cyromazine	7.50e-03 i					27	2.7	1	770	59
Dacthal	5.00e-01 i					1800	180	68	51000	3900
Dalapon	3.00e-02 i					110	11	4.1	3100	230
Danitol	5.00e-04 i					1.8	0.18	0.068	51	3.9
DDD			2.40e-01 i			0.35	0.035	0.013	12	7.1
DDE			3.40e-01 i			0.25	0.025	0.0093	8.4	5
DDT	5.00e-04 i		3.40e-01 i	3.40e-01 i		0.25	0.025	0.0093	8.4	3.9
Decabromodiphenyl ether	1.00e-02 i				y	6.1	3.7	1.4	1000	78
Demeton	4.00e-05 i					0.15	0.015	0.0054	4.1	0.31
Diallate			6.10e-02 h		y	0.23	0.14	0.052	47	28
Diazinon	9.00e-04 h					3.3	0.33	0.12	92	7
1,4-Dibromobenzene	1.00e-02 i				y	6.1	3.7	1.4	1000	78
Dibromochloromethane	2.00e-02 i		8.40e-02 i		y	0.17	0.1	0.038	34	20
1,2-Dibromo-3-chloropropane		5.71e-05 i	1.40e+00 h	2.40e-03 h	y	0.035	0.021	0.0023	2	1.2
1,2-Dibromoethane			8.50e+01 i	7.70e-01 i	y	0.00096	0.011	0.000037	0.034	0.012
Di-n-butyl phthalate	1.00e-01 i					370	37	14	10000	780
Dicamba	3.00e-02 i					110	11	4.1	3100	230
1,2-Dichlorobenzene	9.00e-02 i	5.71e-02 a			y	37	21	12	9200	700
1,3-Dichlorobenzene	8.90e-02 o				y	54	32	12	9100	700
1,4-Dichlorobenzene		2.00e-01 h	2.40e-02 h		y	0.59	0.35	0.13	120	71
3,3'-Dichlorobenzidine			4.50e-01 i			0.19	0.019	0.007	6.4	3.8
1,4-Dichloro-2-butene				9.30e+00 h	y	0.0015	0.00092			
Dichlorodifluoromethane	2.00e-01 i	5.71e-02 a			y	39	21	27	20000	1600
1,1-Dichloroethane	1.00e-01 h	1.43e-01 a			y	81	52	14	10000	780
1,2-Dichloroethane (EDC)			9.10e-02 i	9.10e-02 i	y	0.16	0.094	0.035	31	19
1,1-Dichloroethylene	9.00e-03 i		6.00e-01 i	1.75e-01 i	y	0.058	0.049	0.0053	4.8	2.8
1,2-Dichloroethylene (cis)	1.00e-02 h				y	6.1	3.7	1.4	1000	78
1,2-Dichloroethylene (trans)	2.00e-02 i				y	12	7.3	2.7	2000	160
1,2-Dichloroethylene (mixture)	9.00e-03 h				y	5.5	3.3	1.2	920	70
2,4-Dichlorophenol	3.00e-03 i					11	1.1	0.41	310	23
4-(2,4-Dichlorophenoxy)butyric Acid (2,4-DB)	8.00e-03 i					29	2.9	1.1	820	63
2,4-Dichlorophenoxyacetic Acid (2,4-D)	1.00e-02 i				y	6.1	3.7	1.4	1000	[illegible]
1,2-Dichloropropane		1.14e-03 i	6.80e-02 h		y	0.21	0.13	0.046	42	23

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
1,3-Dichloropropene	3.00e-04 i	5.71e-03 i	1.80e-01 h	1.30e-01 h	y	0.1	0.066	0.018	16	2.3
2,3-Dichloropropanol	3.00e-03 i					11	1.1	0.41	310	23
Dichlorvos	8.00e-04 x		2.90e-01 i			0.29	0.029	0.011	9.9	5.9
Dicofol			4.40e-01 x			0.19	0.019	0.0072	6.5	3.9
Dicyclopentadiene	3.00e-02 h	5.71e-05 a			y	0.042	0.021	4.1	3100	230
Dieldrin	5.00e-05 i		1.60e+01 i	1.61e+01 i		0.0053	0.00053	0.0002	0.18	0.11
Diethylene glycol, monobutyl ether		5.71e-03 h				21	2.1			
Diethylene glycol, monoethyl ether	2.00e+00 h					7300	730	270	200000	16000
Diethylformamide	1.10e-02 h					40	4	1.5	1100	86
Di(2-ethylhexyl)adipate	6.00e-01 i		1.20e-03 i			71	7.1	2.6	2400	1400
Diethyl phthalate	8.00e-01 i					2900	290	110	82000	6300
Diethylstilbestrol			4.70e+03 h			0.000018	0.0000018	0.00000067	0.00061	0.00036
Difenzoquat (Avenge)	8.00e-02 i					290	29	11	8200	630
Diflubenzuron	2.00e-02 i					73	7.3	2.7	2000	160
Diisopropyl methylphosphonate (DIMP)	8.00e-02 i					290	29	11	8200	630
Dimethipin	2.00e-02 i					73	7.3	2.7	2000	160
Dimethoate	2.00e-04 i					0.73	0.073	0.027	20	1.6
3,3'-Dimethoxybenzidine			1.40e-02 h			6.1	0.61	0.23	200	120
Dimethylamine		5.71e-06 x				0.021	0.0021			
N-N-Dimethylaniline	2.00e-03 i					7.3	0.73	0.27	200	16
2,4-Dimethylaniline			7.50e-01 h			0.11	0.011	0.0042	3.8	2.3
2,4-Dimethylaniline hydrochloride			5.80e-01 h			0.15	0.015	0.0054	4.9	2.9
3,3'-Dimethylbenzidine			9.20e+00 h			0.0093	0.00093	0.00034	0.31	0.19
1,1-Dimethylhydrazine			2.60e+00 h	3.50e+00 h		0.033	0.0024	0.0012	1.1	0.66
1,2-Dimethylhydrazine			3.70e+01 h	3.70e+01 h		0.0023	0.00023	0.000085	0.077	0.046
N,N-Dimethylformamide	1.00e-01 h	8.57e-03 i				370	3.1	14	10000	780
2,4-Dimethylphenol	2.00e-02 i					73	7.3	2.7	2000	160
2,6-Dimethylphenol	6.00e-04 i					2.2	0.22	0.081	61	4.7
3,4-Dimethylphenol	1.00e-03 i					3.7	0.37	0.14	100	7.8
Dimethyl phthalate	1.00e+01 h					37000	3700	1400	1000000	78000
Dimethyl terephthalate	1.00e-01 i					370	37	14	10000	780
4,6-Dinitro-o-cyclohexyl phenol	2.00e-03 i					7.3	0.73	0.27	200	16
1,2-Dinitrobenzene	4.00e-04 h					1.5	0.15	0.054	41	3.1
1,3-Dinitrobenzene	1.00e-04 i					0.37	0.037	0.014	10	0.78
1,4-Dinitrobenzene	4.00e-04 h					1.5	0.15	0.054	41	3.1
2,4-Dinitrophenol	2.00e-03 i					7.3	0.73	0.27	200	16
Dinitrotoluene mixture			6.80e-01 i			0.13	0.013	0.0046	4.2	2.5

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/industrial soil (mg/kg)	Residential soil (mg/kg)
2,4-Dinitrotoluene	2.00e-03 i		i			73	0.73	0.27	200	16
2,6-Dinitrotoluene			6.80e-01 i			0.13	0.013	0.0046	4.2	2.5
Dinoseb	1.00e-03 i					3.7	0.37	0.14	100	7.8
di-n-Octyl phthalate	2.00e-02 h					73	7.3	2.7	2000	160
1,4-Dioxane			1.10e-02 i			7.7	0.77	0.29	260	150
Diphenamid	3.00e-02 i					110	11	4.1	3100	230
Diphenylamine	2.50e-02 i					91	9.1	3.4	2600	200
1,2-Diphenylhydrazine			8.00e-01 i	7.70e-01 i		0.11	0.011	0.0039	3.6	2.1
Diquat	2.20e-03 i					8	0.8	0.3	220	17
Direct black 38			8.60e+00 h			0.0099	0.00099	0.00037	0.33	0.2
Direct blue 6			8.10e+00 h			0.011	0.0011	0.00039	0.35	0.21
Direct brown 35			9.30e+00 h			0.0092	0.00092	0.00034	0.31	0.18
Disulfoton	4.00e-05 i					0.15	0.015	0.0054	4.1	0.31
Diuron	2.00e-03 i					7.3	0.73	0.27	200	16
Dodine	4.00e-03 i					15	1.5	0.54	410	31
Endosulfan	5.00e-05 i					0.18	0.018	0.0068	5.1	0.39
Endothall	2.00e-02 i					73	7.3	2.7	2000	160
Endrin	3.00e-04 i					1.1	0.11	0.041	31	2.3
Epichlorohydrin	2.00e-03 h	2.86e-04 i	9.90e-03 i	4.20e-03 i		7.3	0.1	0.27	200	16
1,2-Epoxybutane		5.71e-03 i				21	2.1			
EPTC (S-Ethyl dipropylthiocarbamate)	2.50e-02 i					91	9.1	3.4	2600	200
Ethephon (2-chloroethyl phosphonic acid)	5.00e-03 i					18	1.8	0.68	510	39
Ethion	5.00e-04 i					1.8	0.18	0.068	51	3.9
2-Ethoxyethanol	4.00e-01 h	5.71e-02 i				1500	21	54	41000	3100
2-Ethoxyethanol acetate	3.00e-01 a					1100	110	41	31000	2300
Ethyl acetate	9.00e-01 i					3300	330	120	92000	7000
Ethyl acrylate			4.80e-02 h			1.8	0.18	0.066	60	35
Ethylbenzene	1.00e-01 i	2.86e-01 i			y	130	100	14	10000	780
Ethylene cyanohydrin	3.00e-01 h					1100	110	41	31000	2300
Ethylene diamine	2.00e-02 h					73	7.3	2.7	2000	160
Ethylene glycol	2.00e+00 i					7300	730	270	200000	16000
Ethylene glycol, monobutyl ether		5.71e-03 h				21	2.1			
Ethylene oxide			1.02e+00 h	3.50e-01 h		0.083	0.024	0.0031	2.8	1.7
Ethylene thiourea (ETU)	8.00e-05 i		6.00e-01 h			0.14	0.014	0.0053	4.8	[illegible]
Ethyl chloride	2.00e-02 e	2.86e+00 i			y	71	1000	27	2000	[illegible]
Ethyl ether	2.00e-01 i				y	120	73	27	20000	[illegible]

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
Ethyl methacrylate	9.00e-02 h					330	33	12	9200	700
Ethyl p-nitrophenyl phenylphosphorothioate	1.00e-05 i					0.037	0.0037	0.0014	1	0.078
Ethylnitrosourea			1.40e+02 h			0.00061	0.000061	0.000023	0.02	0.012
Ethylphthalyl ethyl glycolate	3.00e+00 i					11000	1100	410	310000	23000
Express	8.00e-03 i					29	2.9	1.1	820	63
Fenamiphos	2.50e-04 i					0.91	0.091	0.034	26	2
Fluometuron	1.30e-02 i					47	4.7	1.8	1300	100
Fluoride	6.00e-02 i					220	22	8.1	6100	470
Fluoridone	8.00e-02 i					290	29	11	8200	630
Flurprimidol	2.00e-02 i					73	7.3	2.7	2000	160
Flutolanil	6.00e-02 i					220	22	8.1	6100	470
Fluvalinate	1.00e-02 i					37	3.7	1.4	1000	78
Folpet	1.00e-01 i		3.50e-03 i			24	2.4	0.9	820	490
Fomesafen			1.90e-01 i			0.45	0.045	0.017	15	9
Fonofos	2.00e-03 i					7.3	0.73	0.27	200	16
Formaldehyde	2.00e-01 i			4.55e-02 i		730	0.19	27	20000	1600
Formic Acid	2.00e+00 h					7300	730	270	200000	16000
Fosetyl-al	3.00e+00 i					11000	1100	410	310000	23000
Furan	1.00e-03 i					3.7	0.37	0.14	100	7.8
Furazolidone			3.80e+00 h			0.022	0.0022	0.00083	0.75	0.45
Furfural	3.00e-03 i	1.43e-02 a				11	5.2	0.41	310	23
Furium			5.00e+01 h			0.0017	0.00017	0.000063	0.057	0.034
Furmecyclox			3.00e-02 i			2.8	0.28	0.11	95	57
Glufosinate-ammonium	4.00e-04 i					1.5	0.15	0.054	41	3.1
Glycidaldehyde	4.00e-04 i	2.86e-04 h				1.5	0.1	0.054	41	3.1
Glyphosate	1.00e-01 i					370	37	14	10000	780
Haloxyfop-methyl	5.00e-05 i					0.18	0.018	0.0068	5.1	0.39
Harmony	1.30e-02 i					47	4.7	1.8	1300	100
Heptachlor	5.00e-04 i		4.50e+00 i	4.55e+00 i	y	0.0031	0.0019	0.0007	0.64	0.38
Heptachlor epoxide	1.30e-05 i		9.10e+00 i	9.10e+00 i	y	0.0016	0.00094	0.00035	0.31	0.1
Hexabromobenzene	2.00e-03 i				y	1.2	0.73	0.27	200	16
Hexachlorobenzene	8.00e-04 i		1.60e+00 i	1.61e+00 i	y	0.0088	0.0053	0.002	1.8	1.1
Hexachlorobutadiene	2.00e-03 i		7.80e-02 i	7.70e-02 i	y	0.18	0.11	0.04	37	16
HCH (alpha)			6.30e+00 i	6.30e+00 i		0.014	0.0014	0.0005	0.45	0.27
HCH (beta)			1.80e+00 i	1.80e+00 i		0.047	0.0047	0.0018	1.6	0.95
HCH (gamma) Lindane	3.00e-04 i		1.30e+00 h			0.066	0.0066	0.0024	2.2	1.3
HCH-technical			1.80e+00 i	1.79e+00 i		0.047	0.0048	0.0018	1.6	0.95

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
Hexachlorocyclopentadiene	7.00e-03 i	2.00e-05 h			y	0.015	0.0073	0.95	720	55
Hexachlorodibenzo-p-dioxin mixture (HxCDD)			6.20e+03 i	4.55e+03 i		0.000014	0.0000019	0.00000051	0.00046	0.00027
Hexachloroethane	1.00e-03 i		1.40e-02 i	1.40e-02 i	y	0.61	0.37	0.14	100	7.8
Hexachlorophene	3.00e-04 i					1.1	0.11	0.041	31	2.3
n-Hexane	6.00e-02 h	5.71e-02 i			y	35	21	8.1	6100	470
Hexazinone	3.30e-02 i					120	12	4.5	3400	260
Hydrazine, hydrazine sulfate			3.00e+00 i	1.72e+01 i		0.028	0.0005	0.0011	0.95	0.57
Hydrogen chloride		2.00e-03 i				7.3	0.73			
Hydrogen sulfide	3.00e-03 i	2.57e-04 i				11	0.094	0.41	310	23
p-Hydroquinone	4.00e-02 h					150	15	5.4	4100	310
Imazalil	1.30e-02 i					47	4.7	1.8	1300	110
Imazaquin	2.50e-01 i					910	91	34	26000	2000
Iprodione	4.00e-02 i					150	15	5.4	4100	310
Isobutanol	3.00e-01 i				y	180	110	41	31000	2300
Isophorone	2.00e-01 i		9.50e-04 i			90	9	3.3	3000	1600
Isopropalin	1.50e-02 i					55	5.5	2	1500	120
Isopropyl methyl phosphonic acid (IMPA)	1.00e-01 i					370	37	14	10000	780
Isoxaben	5.00e-02 i					180	18	6.8	5100	390
Kepone			1.80e+01 e			0.0047	0.00047	0.00018	0.16	0.095
Lactofen	2.00e-03 i					7.3	0.73	0.27	200	16
Lead (tetraethyl)	1.00e-07 i					0.00037	0.000037	0.000014	0.01	0.00078
Linuron	2.00e-03 i					7.3	0.73	0.27	200	16
Lithium	2.00e-02 e					73	7.3	2.7	2000	160
Londax	2.00e-01 i					730	73	27	20000	1600
Malathion	2.00e-02 i					73	7.3	2.7	2000	160
Maleic anhydride	1.00e-01 i					370	37	14	10000	780
Maleic hydrazide	5.00e-01 i					1800	180	68	51000	3900
Malononitrile	2.00e-05 h					0.073	0.0073	0.0027	2	0.16
Mancozeb	3.00e-02 h					110	11	4.1	3100	230
Maneb	5.00e-03 i					18	1.8	0.68	510	39
Manganese and compounds	1.00e-01 x	1.14e-04 i				370	0.042	14	10000	780
Mephosfolan	9.00e-05 h					0.33	0.033	0.012	9.2	0.7
Mepiquat	3.00e-02 i					110	11	4.1	3100	230
Mercury and compounds (methyl)	3.00e-04 i					1.1	0.11	0.041	31	2.3
Mercury and compounds (inorganic)	3.00e-04 h	8.57e-05 h				1.1	0.031	0.041	31	2.3
Merphos	3.00e-05 i					0.11	0.011	0.0041	3.1	0.23

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
Merphos oxide	3.00e-05 i					0.11	0.011	0.0041	3.1	0.23
Metalaxyl	6.00e-02 i					220	22	8.1	6100	470
Methacrylonitrile	1.00e-04 i	2.00e-04 a				0.37	0.073	0.014	10	0.78
Methamidophos	5.00e-05 i					0.18	0.018	0.0068	5.1	0.39
Methanol	5.00e-01 i					1800	180	68	51000	3900
Methidathion	1.00e-03 i					3.7	0.37	0.14	100	7.8
Methomyl	2.50e-02 i					91	9.1	3.4	2600	200
Methoxychlor	5.00e-03 i					18	1.8	0.68	510	39
2-Methoxyethanol	4.00e-03 h	5.71e-03 i				15	2.1	0.54	410	31
2-Methoxyethanol acetate	2.00e-03 a					7.3	0.73	0.27	200	16
2-Methoxy-5-nitroaniline			4.60e-02 h			1.9	0.19	0.069	62	37
Methyl acetate	1.00e+00 h					3700	370	140	100000	7800
Methyl acrylate	3.00e-02 a					110	11	4.1	3100	230
2-Methylaniline (o-toluidine)			2.40e-01 h			0.35	0.035	0.013	12	7.1
2-Methylaniline hydrochloride			1.80e-01 h			0.47	0.047	0.018	16	9.5
Methyl chlorocarbonate	1.00e+00 x					3700	370	140	100000	7800
2-Methyl-4-chlorophenoxyacetic acid	5.00e-04 i					1.8	0.18	0.068	51	3.9
4-(2-Methyl-4-chlorophenoxy) butyric acid (MCPB)	1.00e-02 i					37	3.7	1.4	1000	78
2-(2-Methyl-4-chlorophenoxy) propionic acid	1.00e-03 i					3.7	0.37	0.14	100	7.8
2-(2-Methyl-1,4-chlorophenoxy) propionic acid (MCPP)	1.00e-03 i					3.7	0.37	0.14	100	7.8
Methylcyclohexane		8.57e-01 h				3100	310			
4,4'-Methylenediphenyl isocyanate		5.71e-06 h			y	0.0035	0.0021			
4,4'-Methylenebisbenzeneamine			2.50e-01 h			0.34	0.034	0.013	11	6.8
4,4'-Methylene bis(2-chloroaniline)	7.00e-04 h		1.30e-01 h	1.30e-01 h		0.66	0.066	0.024	22	5.5
4,4'-Methylene bis(N,N'-dimethyl)aniline			4.60e-02 i			1.9	0.19	0.069	62	37
Methylene bromide	1.00e-02 a				y	6.1	3.7	1.4	1000	78
Methylene chloride	6.00e-02 i	8.57e-01 h	7.50e-03 i	1.65e-03 i	y	5.4	5.2	0.42	380	230
Methyl ethyl ketone	5.00e-02 h	2.86e-01 i				180	100	6.8	5100	390
Methyl hydrazine			1.10e+00 h			0.077	0.0077	0.0029	2.6	1.5
Methyl isobutyl ketone	5.00e-02 h	2.29e-02 a				180	8.3	6.8	5100	390
Methyl methacrylate	8.00e-02 h					290	29	11	8200	630
2-Methyl-5-nitroaniline			3.30e-02 h			2.6	0.26	0.096	87	52
Methyl parathion	2.50e-04 i					0.91	0.091	0.034	26	2
2-Methylphenol (o-cresol)	5.00e-02 i					180	18	6.8	5100	390

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
3-Methylphenol (m-cresol)	5.00e-02 i					180	18	6.8	5100	390
4-Methylphenol (p-cresol)	5.00e-03 h					18	1.8	0.68	510	39
Methyl styrene (mixture)	6.00e-03 a	1.14e-02 a			y	6	4.2	0.81	610	47
Methyl styrene (alpha)	7.00e-02 a				y	43	26	9.5	7200	550
Methyl tertbutyl ether (MTBE)	5.00e-03 e	1.43e-01 i				18	52	0.68	510	39
Metolachlor (Dual)	1.50e-01 i					550	55	20	15000	1200
Metribuzin	2.50e-02 i					91	9.1	3.4	2600	200
Mirex	2.00e-04 i		1.80e+00 h			0.047	0.0047	0.0018	1.6	0.95
Molinate	2.00e-03 i					7.3	0.73	0.27	200	16
Molybdenum	5.00e-03 h					18	1.8	0.68	510	39
Monochloramine	1.00e-01 h					370	37	14	10000	780
Naled	2.00e-03 i					7.3	0.73	0.27	200	16
Napropamide	1.00e-01 i					370	37	14	10000	780
Nickel and compounds	2.00e-02 i					73	7.3	2.7	2000	160
Nickel refinery dust				8.40e-01 i			0.01			
Nickel subsulfide				1.70e+00 i			0.005			
Nitrapyrin	1.50e-03 x					5.5	0.55	0.2	150	12
Nitrate	1.60e+00 i					5800	580	220	160000	13000
Nitric Oxide	1.00e-01 i					370	37	14	10000	780
Nitrite	1.00e-01 i					370	37	14	10000	780
2-Nitroaniline	6.00e-05 h	5.71e-05 h				0.22	0.021	0.0081	6.1	0.47
3-Nitroaniline	3.00e-03 o					11	1.1	0.41	310	23
4-Nitroaniline	3.00e-03 o					11	1.1	0.41	310	23
Nitrobenzene	5.00e-04 i	5.71e-04 a			y	0.34	0.21	0.068	51	3.9
Nitrofurantoin	7.00e-02 h					260	26	9.5	7200	550
Nitrofurazone			1.50e+00 h	9.40e+00 h		0.057	0.00091	0.0021	1.9	1.1
Nitrogen dioxide	1.00e+00 i					3700	370	140	100000	7800
Nitroguanidine	1.00e-01 i					370	37	14	10000	780
4-Nitrophenol	6.20e-02 o					230	23	8.4	6300	480
2-Nitropropane		5.71e-03 i		9.40e+00 h		21	0.00091			
N-Nitrosodi-n-butylamine			5.40e+00 i	5.60e+00 i		0.016	0.0015	0.00058	0.53	0.32
N-Nitrosodiethanolamine			2.80e+00 i			0.03	0.003	0.0011	1	0.61
N-Nitrosodiethylamine			1.50e+02 i	1.51e+02 i		0.00057	0.000057	0.000021	0.019	0.011
N-Nitrosodimethylamine			5.10e+01 i	4.90e+01 i		0.0017	0.00017	0.000062	0.056	0.033
N-Nitrosodiphenylamine			4.90e-03 i			17	1.7	0.64	580	350
N-Nitroso di-n-propylamine			7.00e+00 i			0.012	0.0012	0.00045	0.41	0.24
N-Nitroso-N-methylethylamine			2.20e+01 i			0.0039	0.00039	0.00014	0.13	0.077
N-Nitrosopyrrolidine			2.10e+00 i	2.14e+00 i		0.041	0.004	0.0015	1.4	0.81

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
m-Nitrotoluene	1.00e-02 h				y	6.1	3.7	1.4	1000	78
p-Nitrotoluene	1.00e-02 h				y	6.1	3.7	1.4	1000	78
Norflurazon	4.00e-02 i					150	15	5.4	4100	310
NuStar	7.00e-04 i					26	0.26	0.095	72	5.5
Octabromodiphenyl ether	3.00e-03 i					11	1.1	0.41	310	23
Octahydro-1357-tetranitro-1357-tetrazocine (HMX)	5.00e-02 i					180	18	6.8	5100	390
Octamethylpyrophosphoramide	2.00e-03 h					7.3	0.73	0.27	200	16
Oryzalin	5.00e-02 i					180	18	6.8	5100	390
Oxadiazon	5.00e-03 i					18	1.8	0.68	510	39
Oxamyl	2.50e-02 i					91	9.1	3.4	2600	200
Oxyfluorfen	3.00e-03 i					11	1.1	0.41	310	23
Paclobutrazol	1.30e-02 i					47	4.7	1.8	1300	100
Paraquat	4.50e-03 i					16	1.6	0.61	460	35
Parathion	6.00e-03 h					22	2.2	0.81	610	47
Pebulate	5.00e-02 h					180	18	6.8	5100	390
Pendimethalin	4.00e-02 i					150	15	5.4	4100	310
Pentabromo-6-chloro cyclohexane			2.30e-02 h			3.7	0.37	0.14	120	74
Pentabromodiphenyl ether	2.00e-03 i					7.3	0.73	0.27	200	16
Pentachlorobenzene	8.00e-04 i				y	0.49	0.29	0.11	82	6.3
Pentachloronitrobenzene	3.00e-03 i		2.60e-01 h		y	0.055	0.033	0.012	11	6.6
Pentachlorophenol	3.00e-02 i		1.20e-01 i			0.71	0.071	0.026	24	14
Permethrin	5.00e-02 i					180	18	6.8	5100	390
Phenmedipham	2.50e-01 i					910	91	34	26000	2000
Phenol	6.00e-01 i					2200	220	81	61000	4700
m-Phenylenediamine	6.00e-03 i					22	2.2	0.81	610	47
p-Phenylenediamine	1.90e-01 h					690	69	26	19000	1500
Phenylmercuric acetate	8.00e-05 i					0.29	0.029	0.011	8.2	0.63
Phenylphenol			1.94e-03 h			44	4.4	1.6	1500	880
Phorate	2.00e-04 h					0.73	0.073	0.027	20	1.6
Phosmet	2.00e-02 i					73	7.3	2.7	2000	160
Phosphine	3.00e-04 i	8.57e-06 h				1.1	0.0031	0.041	31	2.3
Phosphorus (white)	2.00e-05 i					0.073	0.0073	0.0027	2	0.16
p-Phthalic acid	1.00e+00 h					3700	370	140	100000	7800
Phthalic anhydride	2.00e+00 i					7300	730	270	200000	16000
Picloram	7.00e-02 i					260	26	9.5	7200	550
Pirimiphos-methyl	1.00e-02 i					37	3.7	1.4	1000	78
Polybrominated biphenyls	7.00e-06 h		8.90e+00 h			0.0096	0.00096	0.00035	0.32	0.055

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Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
Polychlorinated biphenyls (PCBs)			7.70e+00 i			0.011	0.0011	0.00041	0.37	0.22
Polychlorinated terphenyls (PCTs)			4.50e+00 e			0.019	0.0019	0.0007	0.64	0.38
Polynuclear aromatic hydrocarbons										
Acenaphthene	6.00e-02 i					220	22	8.1	6100	470
Anthanthrene			2.31e+00 o	1.93e+00 o		0.037	0.0044	0.0014	1.2	0.74
Anthracene	3.00e-01 i					1100	110	41	31000	2300
Benz[a]anthracene			1.06e+00 o	8.85e-01 o		0.08	0.0096	0.003	2.7	1.6
Benzo[b]fluoranthene			8.96e-01 o	7.49e-01 o		0.095	0.011	0.0035	3.2	1.9
Benzo[j]fluoranthene			3.82e-01 o	3.19e-01 o		0.22	0.027	0.0083	7.5	4.5
Benzo[k]fluoranthene			3.88e-01 o	3.25e-01 o		0.22	0.026	0.0081	7.4	4.4
Benzo[ghi]perylene			1.55e-01 o	1.29e-01 o		0.55	0.066	0.02	18	11
Benzo[a]pyrene			7.30e+00 i	6.10e+00 h		0.012	0.0014	0.00043	0.39	0.23
Benzo[e]pyrene			5.11e-02 o	4.27e-02 o		1.7	0.2	0.062	56	33
Dibenz[ah]anthracene			8.10e+00 o	6.77e+00 o		0.011	0.0013	0.00039	0.35	0.21
Fluoranthene	4.00e-02 i					150	15	5.4	4100	310
Fluorene	4.00e-02 i					150	15	5.4	4100	310
Indeno[1,2,3-cd]pyrene			2.03e+00 o	1.70e+00 o		0.042	0.005	0.0016	1.4	0.84
Naphthalene	4.00e-02 h					150	15	5.4	4100	310
Phenanthrene	2.90e-02 o					110	11	3.9	3000	230
Pyrene	3.00e-02 i					110	11	4.1	3100	230
Prochloraz	9.00e-03 i		1.50e-01 i			0.57	0.057	0.021	19	11
Profluralin	6.00e-03 h					22	2.2	0.81	610	47
Prometon	1.50e-02 i					55	5.5	2	1500	120
Prometryn	4.00e-03 i					15	1.5	0.54	410	31
Pronamide	7.50e-02 i					270	27	10	7700	590
Propachlor	1.30e-02 i					47	4.7	1.8	1300	100
Propanil	5.00e-03 i					18	1.8	0.68	510	39
Propargite	2.00e-02 i					73	7.3	2.7	2000	160
Propargyl alcohol	2.00e-03 i					7.3	0.73	0.27	200	16
Propazine	2.00e-02 i					73	7.3	2.7	2000	160
Propham	2.00e-02 i					73	7.3	2.7	2000	160
Propiconazole	1.30e-02 i					47	4.7	1.8	1300	100
Propylene glycol	2.00e+01 h					73000	7300	2700	2000000	160000
Propylene glycol, monoethyl ether	7.00e-01 h					2600	260	95	72000	5500
Propylene glycol, monomethyl ether	7.00e-01 h	5.71e-01 i				2600	210	95	72000	5500
Propylene oxide		8.57e-03 i	2.40e-01 i	1.30e-02 i		0.35	0.66	0.013	12	7.1
Pursuit	2.50e-01 i					910	91	34	26000	2000
Pydrin	2.50e-02 i					91	9.1	3.4	2600	200

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4839

EPA Region III Risk-Based Concentrations (for use with Region III technical guidance on selecting exposure routes and contaminants of concern by risk-based screening): October 26, 1992

6028

Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/industrial soil (mg/kg)	Residential soil (mg/kg)
Pyridine	1.00e-03 i					3.7	0.37	0.14	100	7.8
Quinalphos	5.00e-04 i					1.8	0.18	0.068	51	3.9
Quinoline			1.20e+01 h			0.0071	0.00071	0.00026	0.24	0.14
RDX (Cyclonite)	3.00e-03 i		1.10e-01 i			0.77	0.077	0.029	26	15
Resmethrin	3.00e-02 i					110	11	4.1	3100	230
Ronnel	5.00e-02 h					180	18	6.8	5100	390
Rotenone	4.00e-03 i					15	1.5	0.54	410	31
Savey	2.50e-02 i					91	9.1	3.4	2600	200
Selenious Acid	5.00e-03 i					18	1.8	0.68	510	39
Selenium	5.00e-03 i					18	1.8	0.68	510	39
Selenourea	5.00e-03 h					18	1.8	0.68	510	39
Sethoxydim	9.00e-02 i					330	33	12	9200	700
Silver and compounds	5.00e-03 i					18	1.8	0.68	510	39
Simazine	2.00e-03 h		1.20e-01 h			0.71	0.071	0.026	24	14
Sodium azide	4.00e-03 i					15	1.5	0.54	410	31
Sodium diethyldithiocarbamate	3.00e-02 i		2.70e-01 h			0.32	0.032	0.012	11	6.3
Sodium fluoroacetate	2.00e-05 i					0.073	0.0073	0.0027	2	0.16
Sodium metavanadate	1.00e-03 h					3.7	0.37	0.14	100	7.8
Strontium, stable	6.00e-01 i					2200	220	81	61000	4700
Strychnine	3.00e-04 i					1.1	0.11	0.041	31	2.3
Styrene	2.00e-01 i		3.00e-02 o		y	0.47	0.28	0.11	95	57
Systhane	2.50e-02 i					91	9.1	3.4	2600	200
2,3,7,8-TCDD (dioxin)			1.50e+05 h	1.50e+05 h		0.00000057	0.000000057	0.000000021	0.000019	0.000011
Tebuthiuron	7.00e-02 i					260	26	9.5	7200	550
Temephos	2.00e-02 h					73	7.3	2.7	2000	160
Terbacil	1.30e-02 i					47	4.7	1.8	1300	100
Terbufos	2.50e-05 h					0.091	0.0091	0.0034	2.6	0.2
Terbutryn	1.00e-03 i					3.7	0.37	0.14	100	7.8
1,2,4,5-Tetrachlorobenzene	3.00e-04 i				y	0.18	0.11	0.041	31	2.3
1,1,1,2-Tetrachloroethane	3.00e-02 i		2.60e-02 i	2.59e-02 i	y	0.55	0.33	0.12	110	66
1,1,2,2-Tetrachloroethane			2.00e-01 i	2.03e-01 i	y	0.07	0.042	0.016	14	8.5
Tetrachloroethylene (PCE)	1.00e-02 i		5.20e-02 e	2.03e-03 e	y	1.4	3.7	0.061	55	33
2,3,4,6-Tetrachlorophenol	3.00e-02 i					110	11	4.1	3100	230
p,a,a,a-Tetrachlorotoluene			2.00e+01 h		y	0.00071	0.00043	0.00016	0.14	0.085
Tetrachlorovinphos	3.00e-02 i		2.40e-02 h			3.5	0.35	0.13	120	71
Tetraethyldithiopyrophosphate	5.00e-04 i					1.8	0.18	0.068	51	3.9
Tetrahydrofuran	2.00e-03 o					7.3	0.73	0.27	200	16
Thallic oxide	7.00e-05 h					0.26	0.026	0.0095	7.2	0.55

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EPA Region III Risk-Based Concentrations (for use with Region III technical guidance on selecting exposure routes and contaminants of concern by risk-based screening): October 26, 1992

Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
Thallium acetate	9.00e-05 i					0.33	0.033	0.012	9.2	0.7
Thallium carbonate	8.00e-05 i					0.29	0.029	0.011	8.2	0.63
Thallium chloride	8.00e-05 i					0.29	0.029	0.011	8.2	0.63
Thallium nitrate	9.00e-05 i					0.33	0.033	0.012	9.2	0.7
Thallium selenite	9.00e-05 i					0.33	0.033	0.012	9.2	0.7
Thallium sulfate	8.00e-05 i					0.29	0.029	0.011	8.2	0.63
Thiobencarb	1.00e-02 i					37	3.7	1.4	1000	78
2-(Thiocyanomethylthio)-benzothiazole (TCMTB)	3.00e-02 y					110	11	4.1	3100	230
Thiofanox	3.00e-04 h					1.1	0.11	0.041	31	2.3
Thiophanate-methyl	8.00e-02 i					290	29	11	8200	630
Thiram	5.00e-03 i					18	1.8	0.68	510	39
Tin and compounds	6.00e-01 h					2200	220	81	61000	4700
Toluene	2.00e-01 i	1.14e-01 h			y	75	42	27	20000	1600
Toluene-2,4-diamine			3.20e+00 h			0.027	0.0027	0.00099	0.89	0.53
Toluene-2,5-diamine	6.00e-01 h					2200	220	81	61000	4700
Toluene-2,6-diamine	2.00e-01 h					730	73	27	20000	1600
Toxaphene			1.10e+00 i	1.12e+00 i		0.077	0.0076	0.0029	2.6	1.5
Tralomethrin	7.50e-03 i					27	2.7	1	770	59
Triallate	1.30e-02 i					47	4.7	1.8	1300	100
Triasulfuron	1.00e-02 i					37	3.7	1.4	1000	78
1,2,4-Tribromobenzene	5.00e-03 i				y	3	1.8	0.68	510	39
Tributyltin oxide (TBTO)	3.00e-05 i					0.11	0.011	0.0041	3.1	0.23
2,4,6-Trichloroaniline			3.40e-02 h			2.5	0.25	0.093	84	50
2,4,6-Trichloroaniline hydrochloride			2.90e-02 h			2.9	0.29	0.11	99	59
1,2,4-Trichlorobenzene	1.00e-02 i	2.57e-03 a			y	1.8	0.94	1.4	1000	78
1,1,1-Trichloroethane	9.00e-02 h	2.86e-01 a			y	130	100	12	9200	700
1,1,2-Trichloroethane	4.00e-03 i		5.70e-02 i	5.60e-02 i	y	0.25	0.15	0.055	50	30
Trichloroethylene (TCE)	6.00e-03 e		1.10e-02 y	6.00e-03 e	y	2.1	1.4	0.29	260	47
Trichlorofluoromethane	3.00e-01 i	2.00e-01 a			y	130	73	41	31000	2300
2,4,5-Trichlorophenol	1.00e-01 i					370	37	14	10000	780
2,4,6-Trichlorophenol			1.10e-02 i	1.09e-02 i		7.7	0.78	0.29	260	150
2,4,5-Trichlorophenoxyacetic Acid	1.00e-02 i					37	3.7	1.4	1000	78
2-(2,4,5-Trichlorophenoxy) propionic acid	8.00e-03 i					29	2.9	1.1	820	63
1,1,2-Trichloropropane	5.00e-03 i				y	3	1.8	0.68	510	39
1,2,3-Trichloropropane	6.00e-03 i				y	3.7	2.2	0.81	610	47
1,2,3-TCP as carcinogen			2.70e+00 e		y	0.0053	0.0032	0.0012	1.1	0.63

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EPA Region III Risk-Based Concentrations (for use with Region III technical guidance on selecting exposure routes and contaminants of concern by risk-based screening): October 26, 1992

Contaminant	Oral RfD (mg/kg/d)	Inhaled RfD (mg/kg/d)	Oral Potency Slope 1/(mg/kg/d)	Inhaled Potency Slope 1/(mg/kg/d)	VOC	Tap water (µg/l)	Ambient air (µg/m3)	Fish (mg/kg)	Commercial/ industrial soil (mg/kg)	Residential soil (mg/kg)
1,2,3-Trichloropropene	5.00e-03 h				y	3	1.8	0.68	510	[illegible]
1,1,2-Trichloro-1,2,2-trifluoroethane	3.00e+01 i	8.57e+00 h			y	5900	3100	4100	3100000	230000
Tridiphane	3.00e-03 i					11	1.1	0.41	310	23
Triethylamine		2.00e-03 i				7.3	0.73			
Trifluralin	7.50e-03 i		7.70e-03 i			11	1.1	0.41	370	59
Trimethyl phosphate			3.70e-02 h			2.3	0.23	0.085	77	46
1,3,5-Trinitrobenzene	5.00e-05 i					0.18	0.018	0.0068	5.1	0.39
Trinitrophenylmethylnitramine	1.00e-02 h					37	3.7	1.4	1000	78
2,4,6-Trinitrotoluene	5.00e-04 i		3.00e-02 i			1.8	0.18	0.068	51	3.9
Uranium (soluble salts)	3.00e-03 i					11	1.1	0.41	310	23
Vanadium	7.00e-03 h					26	2.6	0.95	720	55
Vanadium pentoxide	9.00e-03 i					33	3.3	1.2	920	70
Vanadyl sulfate	2.00e-02 h					73	7.3	2.7	2000	160
Vanadium sulfate	2.00e-02 h					73	7.3	2.7	2000	160
Vernam	1.00e-03 i					3.7	0.37	0.14	100	7.8
Vinclozolin	2.50e-02 i					91	9.1	3.4	2600	200
Vinyl acetate	1.00e+00 h	5.71e-02 i				3700	21	140	100000	7800
Vinyl chloride			1.90e+00 h	3.00e-01 h	y	0.025	0.028	0.0017	1.5	0.9
Warfarin	3.00e-04 i					1.1	0.11	0.041	31	2.3
m-Xylene	2.00e+00 i	2.00e-01 y			y	140	73	270	200000	16000
o-Xylene	2.00e+00 i	2.00e-01 y			y	140	73	270	200000	16000
p-Xylene		8.57e-02 y			y	52	31			
Xylene (mixed)	2.00e+00 i				y	1200	730	270	200000	16000
Zinc	3.00e-01 i					1100	110	41	31000	2300
Zinc phosphide	3.00e-04 i					1.1	0.11	0.041	31	2.3
Zineb	5.00e-02 i					180	18	6.8	5100	390

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